UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,030	04/08/2004	Atsushi Murayama	0951-0136PUS1	7584

2292 7590 03/14/2007

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
GARCIA, LUIS	
ART UNIT	PAPER NUMBER
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	03/14/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/14/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/820,030	MURAYAMA, ATSUSHI	
	Examiner	Art Unit	
	Luis F. Garcia	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *08 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16 and 18* is/are rejected.

7)☒ Claim(s) *17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

2. Applicant's attention is directed that during the prosecution of a pending patent application, the terms found in the claims should be given the broadest reasonable interpretation, See *In re Pearson, 181 USPQ 641* (CCPA 1974). Therefore, the word "photocoupler" is taken to mean a photonic system that couples optical signals in and out of the system.

Drawings

The drawings are objected to under 37 CFR 1.83(a) because they fail to show "wherein said clock signal transmitter comprises a second light-emitting element and said clock signal receiver comprises a second light-receiving element" as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-2, 5, 7, 12, 13, 16 and 18 are rejected** under 35 U.S.C. 102(b) as being anticipated by King (US 5,917,627).

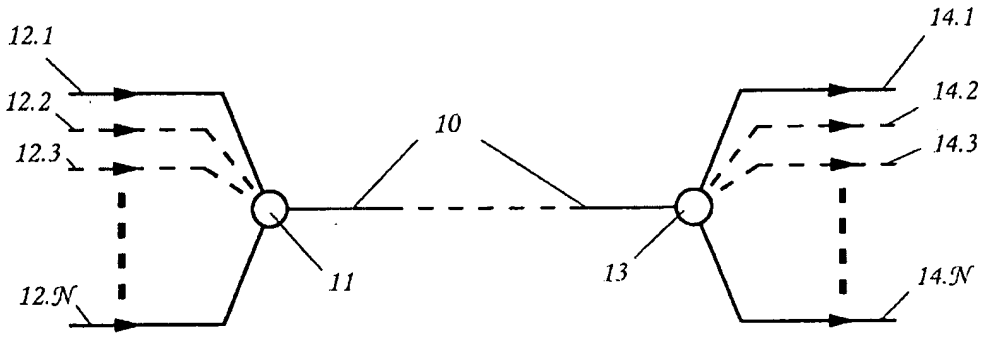


Fig. 1.

Regarding claim 1, King discloses a multichannel photocoupler comprising:

at one or more input sides: one or more time division means for subjecting one or more input signals at one or more respective channels to time division **(Abstract)**; and

a light-emitting element communicating at least one of the time-divided signal or signals to one or more output sides **(col1 ln25-39 and col3 ln1-19 in which a light emitting element for transmitting the optical TDM signal is an inherent part of the system, e.g. Mach Zehnder (optical type modulator) is used to received and decoded the TDM signal; thereby, making the transmitted TDM signal an optical TDM signal created by a light-emitting element. col2 ln64-67 to col3 ln1 in which optical gating is used to decode/separate the received optical TDM signal, e.g. inherently transmitted by a light-emitting element)**;

at one or more output sides: a light-receiving element receiving at least one of the time-divided signal or signals from the light-emitting element **(col2 ln64-67 to col3 ln1 in which optical gating (e.g part of demultiplexer-13)(light-receiving element) is used to received and decode the optical TDM signal)**; and

one or more output signal separation means for decoding at least one of the time-divided signal or signals and for outputting same to at least one of the respective channel or channels **(col2 ln64-67 to col3 ln1 in which optical gates are used to decoded/separate the optical TDM signal; thereby, outputting the separated channels)**.

Regarding claim 2, King discloses a multichannel photocoupler according to claim 1 as applied above.

King further discloses comprising: one or more synchronization means for, in the event that one or more signals at least one of the respective channel or channels is transferred from one or more input sides to one or more output sides, synchronizing the signal or signals through use of one or more prescribed clock signals **(FIG. 1 and col2 ln34-67 to col3 ln1 in which an amplitude modulated signal at a fundamental frequency (clock signal) is modulated with the optical TDM signal in order to synchronize decoding at the demultiplexer, e.g. the amplitude modulated signal at a fundamental frequency is used as a timing/synchronization signal-col3 ln31-45)**.

Regarding claim 5, King disclose a multichannel photocoupler according to claim 2 as applied above.

King further discloses comprising, as one or more means for transferring one or more clock synchronization signals from one or more input sides to one or more output sides **(FIG. 1 and col2 ln34-63 in which the clock signal is transferred from the input side (e.g 11-multiplexer) to the output side (e.g. 13-demultiplexer))**: transfer of one or more clock synchronization signals simultaneous with one or more signals at at least one of the respective channel or channels through use of the light-receiving element and the light-emitting element transferring one or more signals **(col2 ln34-67 to col3 ln1 and FIGs. 2-10 in which the clock signal is transferred simultaneously with the TDM signal (respective channels) through the use of the light emitting element and the light receiving element, e.g. the TDM signal is amplitude**

modulated with the clock signal at the transmitter side; thereby, allowing for simultaneous transmission of the TDM and clock signal).

Regarding claim 7, King discloses a multichannel photocoupler comprising:

at one or more input sides: a light-emitting element transferring one or more signals to at least one of the output side or sides **(FIG. 1 (11-multiplexer) in which the multiplexer transfers OTDM signals to the output side(s) (e.g. to the demultiplexer-13). NOTE: a light emitting element for transmitting an optical TDM signal is an inherent part of the system, e.g. Mach Zehnder (optical type modulator) is used to received and decode the TDM signal; thereby, making the transmitted TDM signal an optical TDM signal created by a light-emitting element)**; and

one or more level coupling means for carrying out level coupling with respect to one or more input signals at at least one of the respective channel or channels so as to impart one or more changes in one or more optical intensities at the light-emitting element **(FIGs. 1,7 and col2 ln34-51 in which the TDM signal is amplitude modulated (via level coupling means)(e.g. change of optical intensity at the light emitting element) via a timing signal-col3 ln31-36)** and for causing same to be transferred to at least one of the output side or sides **(FIG. 1 in which the amplitude modulated TDM signal is transferred to the output side (e.g. to the demultiplexer-13))**;

at one or more output sides: a light-receiving element receiving one or more signals imparted with one or more changes in one or more optical intensities produced

by the light-emitting element **(FIG. 1 (13-demultiplexer) in which the demultiplexer (light receiving element) receives the amplitude modulated TDM signal (signal(s) imparted with changes in optical intensity produced by the light-emitting element). NOTE: the demultiplexer consist of a Mach-Zehnder demodulator-col3 ln1-19 or optical gates-col2 ln64-67 to col3 ln1)**; and

one or more output signal separation means for decoding at least one of the signal or signals and for outputting same to at least one of the respective channel or channels **(col2 ln52-67 to col3 ln1 in which the optical gates combined with the reconstituted clock in the demultiplexer decode/separate the optical TDM signal into respective channels; thereby, a perform the function of claimed output signal separation means)**.

Regarding claim 12, King discloses a multichannel photocoupler comprising:

an input circuit for receiving at least one input signal **(FIG. 1 (12.1-12.N: inputs) in which the inputs inherently receives an input signal from an input circuit, e.g. receives a data signal from the input circuit)**;

a time division circuit for time dividing said at least one input signal to produce a time divided signal **(col1 ln25-39 and col2 ln1-51 in which the system converts N tributary channels into one TDM signal; therefore, a time division circuit for performing this step is an inherent part of the system)**;

an output side comprising a first light-receiving element **(FIG. 1 (13-demultiplexer) in which the demultiplexer (light receiving element) is located at the output side)**;

a first light-emitting element communicating said time-divided signal from said input side to said output side **(FIG. 1 and col1 ln29-36 and col2 ln11-33 in which an optical TDM signal is transmitted from the input side (e.g. 11-multiplexer) to the output side (e.g. 13-demultplexer). NOTE: the TDM signal is inherently transmitted via a light emitting element, e.g. light emitting element generates the optical signal)**; and

an output signal separation circuit for decoding said time-divided signal and outputting the decoded time divided signal as an output signal **(col2 ln52-67 to col3 ln1 in which the optical TDM signal is decoded and each respective tributary is output)**.

Regarding claim 13, King discloses a multichannel photocoupler according to claim 12 as applied above.

King further discloses comprising a clock circuit for generating a clock signal and wherein said input circuit comprises clock signal transmitter and said output circuit comprises a clock signal receiver **(col2 ln34-67 to col1 ln3 in which the clock signal is inherently produced by a transmitter (e.g. creates clock signal waveform of FIGs. 5,6) and transmitted to the receiver side (clock receiver) for use in decoding the received TDM signal; thereby, making a clock generating circuit an inherent part of the system)**.

Regarding claim 16, King further discloses a multichannel photocoupler according to claim 13 as applied above.

King further disclose wherein said clock signal transmitter comprises said first light-emitting element and wherein said clock signal receiver comprises said first light-receiving element **(col2 ln34-67 to col3 ln1 in which the clock signal transmitter transmits via first light-emitting element and wherein the clock signal receiver receives via the first light-receiving element, e.g. both clock and OTDM signal are transmitted and received via same light emitting element and same light receiving element)**.

Regarding claim 18, rejected as stated in claim 7 rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 4 is rejected** under 35 U.S.C. 103(a) as being unpatentable over King in view of Milhizer et al (US 5,692,166), Milhizer et al hereinafter referred to as Milhizer.

Regarding claim 4, King discloses a multichannel photocoupler according to claim 2 as applied above.

King further discloses receiving the TDM data signal and the clock signal at the same receiver/light-receiving element at the output side from the same transmitter at the input side, e.g. the clock is amplitude modulated onto the TDM signal-col2 ln34-67 to col3.

King does not disclose comprising, as one or more means for transferring one or more clock synchronization signals from one or more input sides to one or more output sides: at at least one of the input side or sides: a clock-signal-transfer light-emitting element other than the light-emitting element for transfer of one or more signals; and at at least one of the output side or sides: a clock-signal-transfer light-receiving element other than the light-receiving element for transfer of one or more signals. However, it is well known in the art that to transfer a data and clock signal together as disclosed by King OR separately via two transmitters. The motivation being that this simplifies the synchronizing/decoding of the received signal, e.g. no longer have to extract the embedded clock signal from the received data signal; thereby, allowing for simpler implementation. As evidence of this well-known concept, prior art reference Milhizer is provided. Milhizer discloses one or more means for transferring one or more clock synchronization signals from one or more input sides to one or more output sides (FIG. 2): at at least one of the input side or sides: a clock-signal-transfer transmitter other than the transmitter for transfer of one or more signals (FIG. 2 in which the clock signal transmitter is different from the data transmitter (e.g. one or more signals transmitter)); and at at least one of the output side or sides: a clock-signal-transfer receiver other than the receiver for transfer of one or more signals (FIG. 2 in which the clock receiver is different from the data receiver (e.g. one or more signals receiver)).

5. **Claims 6 is rejected** under 35 U.S.C. 103(a) as being unpatentable over King in view of Cox et al (IEEE, VOL. 38, NO. 5, MAY 1990), Cox et al hereinafter referred to as Cox.

Regarding claim 6, King discloses a multichannel photocoupler according to claim 5 as applied above.

King further discloses comprising, as one or more means for distinguishing between or among one or more clock synchronization signals and one or more signals at at least one of the respective channel or channels **(col2 ln52-67 to col3 ln1 in which the clock signal is extracted from the amplitude modulated TDM signal; thereby, allowing for the clock signal to be used for the purpose of separating the tributary channels)**,

one or more means: for, at at least one of the input side or sides, impart one or more differences to one or more optical intensities in one or more clock synchronization signals **(FIGs. 5,6 and col2 ln34-67 to col3 ln1 in which the clock signal varies in intensity)** and one or more signals at at least one of the respective channel or channels **(FIG. 4 in which the TDM signal (respective channel signals) vary in intensity)** transferred to at least one of the output side or sides **(FIG. 7 in which the combined clock and TDM signal is transferred to the receiver/demultiplexer (output side))**, and for causing same to be transferred to at least one of the output side or sides **(FIG. 7 in which the combined clock and TDM signal is transferred to the receiver/demultiplexer (output side))**; and for, at at least one of the output side or sides, separating one or more signals received at the light-receiving element and having one or more differences in one or more optical intensities into one or more signals at at least one of the respective channel or channels and one or more clock synchronization signals **(col2 ln34-67 to col3 ln1 in which the clock signal is**

extracted from the amplitude modulated TDM signal; thereby, allowing the receiver to separate the respective channels based on the extracted clock signal).

King does not expressly disclose one or more means: for, at at least one of the input side or sides, varying one or more electric currents flowing at the light-emitting element so as to impart one or more differences to one or more optical intensities in one or more clock synchronization signals and one or more signals at at least one of the respective channel or channels transferred to at least one of the output side or sides. Even though King does not expressly disclose the specific type of modulation elements used (e.g. external modulator, directly driven LED/laser), direct and external modulation are well known basic modulation schemes often used in optical communication system for modulating information (e.g. data, clock) onto an optical signal. As evidence of this well known concept, prior art reference Cox is provided. Cox discloses varying one or more electric currents flowing at the light-emitting element so as to impart one or more differences to one or more optical intensities in one or more clock synchronization signals (FIG. 1a in which the current flowing to the laser is varied so as to impart one or more differences in optical intensity in the transmitted signal (e.g. clock signal)) and one or more signals at at least one of the respective channel or channels transferred to at least one of the output side or sides (FIG. 1a in which the transmitted signal is received at the output side (e.g. received by the detector)).

6. **Claims 9-11 are rejected** under 35 U.S.C. 103(a) as being unpatentable over King view of Gulezynski (US 4,845,391).

Regarding claims 9-11, King discloses a multichannel photocoupler according to any of claims 1 through 8 as applied above.

King not expressly disclose wherein: one or more output stages at at least one of the respective channel or channels comprises one or more transistor elements/one or more thyristor elements/one or more triac elements. However, these components are well known in the art and are equally applicable to King's optical gates/switching elements-col2 ln64-67 to col3 ln1(output stages). Optical gates for converting an optical signal into electrical form commonly use transistors and other circuit elements such as thyristor/triac (variations of a transistor) to accomplish this task. As evidence of this well-known concept prior art reference Gulezynski is provided. Gulezynski discloses the use of thyristors, triacs and transistors in switching circuits (Abstract and col1 ln30-57). Therefore, the use of transistors or thyristors or triacs is obvious.

7. **Claim 3 and 14 are rejected** under 35 U.S.C. 103(a) as being unpatentable over King in view of Takatsu et la (US 6,441,955), Takatsu et al hereinafter referred to as Takatsu.

Regarding claim 3, King discloses a multichannel photocoupler according to claim 2 as applied above.

King further discloses wherein: at least one of the synchronization means at at least one of the input side or sides, in the event that one or more input signals at at least one of the respective channel or channels is subjected to time division through use of one or more prescribed clocks **(col2 ln34-67 to col3 ln1 in which the tributary channels are inherently subjected to TDM through use of a the clock signal;**

thereby, allowing the TDM signal to be decoded at the receiver side based on the received clock signal),

King does not expressly disclose at least one of the synchronization means at at least one of the input side or sides generates one or more start bits before one or more signals at one or more first channels; and at least one of the synchronization means at at least one of the output side or sides possesses functionality for detecting at least one of the start bit or bits.

Takatsu teaches at least one of the synchronization means at at least one of the input side or sides generates one or more start bits before one or more signals at one or more first channels **(col19 ln14-32 in which the transmitter (input side) generates a start bit)**; and

at least one of the synchronization means at at least one of the output side or sides possesses functionality for detecting at least one of the start bit or bits **(col19 ln14-32 in which the start bit is detected at the receiver (output side) for verifying the data was properly transmitted (e.g. synchronized properly))**.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify King and incorporate Takatsu's teaching of using start bits. The motivation being that this allows the system to check whether the data was properly received-col19 ln14-32. Thereby, allowing the rapidly recognize a corrupted data signal.

Regarding claim 14, King discloses a multichannel photocoupler according to claim 12 as applied above.

King further discloses comprising a clock circuit for generating a clock signal and wherein said input circuit comprises clock signal transmitting circuit and said output circuit comprises a clock signal receiving circuit **(col2 ln34-67 to col3 ln1 in which the clock signal transmitter transmits via first light-emitting element and wherein the clock signal receiver receives via the first light-receiving element, e.g. both clock and OTDM signal are transmitted and received via same light emitting element and same light receiving element)**.

King does not disclose wherein said clock signal transmitting circuit transmits a start bit and said clock signal receiving circuit is adapted to detect said start bit.

Takatsu teaches wherein said clock signal transmitting circuit transmits a start bit and said clock signal receiving circuit is adapted to detect said start bit **(col19 ln14-32 in which the transmitting circuit transmits a start bit and the receiving circuit is adapted to detect the start bit)**.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify King and incorporate Takatsu's teaching of using start bits. The motivation being that this allows the system to check whether the data was properly received-col19 ln14-32. Furthermore, the start bit is equally applicable to the clock signal, e.g. start bit is transmitted within the clock signal. The motivation being that this allows the system to detect the start bit by only extract the synch clock signal without having then decode the data signal as well, e.g start bit located within the data stream needs to be verified that it is actually a start bit and not a channel data bit.

8. **Claim 8 is rejected** under 35 U.S.C. 103(a) as being unpatentable over King in view of Geller (US 5,502,298).

Regarding claim 8, King discloses a multichannel photocoupler according to claim 7 as applied above.

King does not expressly disclose further comprising: one or more monitor light-receiving elements provided at at least one of the input side or sides; wherein one or more changes over time in one or more optical intensities at the light-emitting element is fed back to at least one of the level coupling means. However, it is well known in the art to monitor a transmitted optical signal via a feedback signal from a photodiode (monitor light-receiving element). As evidence of this well known concept, prior art reference Geller (US 5,502,298) is provided. Geller disclose one or more monitor light-receiving elements provided at at least one of the input side or sides (FIG. 3 and Abstract/col4 ln5-23 in which a monitoring photodiode (monitor light-receiving element) is located at the transmitter (input side)); wherein one or more changes over time in one or more optical intensities at the light-emitting element is fed back to at least one of the level coupling means (FIG. 3 and Abstract/col4 ln5-23 in which the varying light intensity of the transmitted signal is fed back to level coupling means (e.g. to control loop circuitry)). Thereby, allowing the system to dynamically adjust optical parameters of the optical signal.

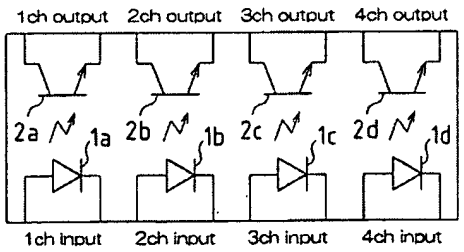
9. **Claim 15 is rejected** under 35 U.S.C. 103(a) as being unpatentable over King.

King does not expressly disclose a multichannel photocoupler according to claim 13 wherein said clock signal transmitter comprises a second light-emitting element and

said clock signal receiver comprises a second light-receiving element. However, it is common in optical systems to transmit a clock signal for a respective clock synched TDM signal as disclosed by King in which transmitting more than one TDM signal would require the use of more than one synched clock signal. Therefore, official notice is taken in that it would have been obvious to one of ordinary skill in the art at the time of invention to including more than one clock transmitter. The motivation being that by transmitting more than one clock signal, allows for more TDM signals to be sent simultaneously which increases data throughput and data transmission efficiency.

10. **Claims 1, 7 and 18 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art in view King, Applicant's Admitted Prior Art hereinafter referred to as AAPA.

FIG.11 Prior Art



Regarding claim 1, AAPA discloses a multichannel photocoupler (FIG. 11) comprising:

at one or more input sides **(FIG. 11 (channel inputs))**; and

a light-emitting element communicating signals to one or more output sides **(FIG. 11 (output) in which the input sides communicates signals with the output sides)**;

at one or more output sides: a light-receiving element receiving at least one of signals from the light-emitting element **(FIG. 11 in which the light-receiving elements at the output side (e.g. PD-2a-d) receive signals form the light-emitting elements (e.g. LEDs-1a-c))**.

AAPA does not expressly disclose at one or more input sides: one or more time division means for subjecting one or more input signals at one or more respective channels to time division; and a light-emitting element communicating at least one of the time-divided signal or signals to one or more output sides; at one or more output sides: a light-receiving element receiving at least one of the time-divided signal or signals from the light-emitting element; and one or more output signal separation means for decoding at least one of the time-divided signal or signals and for outputting same to at least one of the respective channel or channels.

King discloses a light-emitting element communicating at least one of the time-divided signal or signals to one or more output sides **(col3 ln1-19 in a light emitting element for transmitting the TDM signal is an inherent part of the system, e.g. Mach Zehnder (optical type modulator) is used to received and decoded the TDM signal; thereby, making the transmitted TDM signal an optical TDM signal created by a light-emitting element. col2 ln64-67 to col3 ln1 in which optical gating is used to decode/separate the received optical TDM signal, e.g. inherently transmitted by a light-emitting element)**;

at one or more output sides: a light-receiving element receiving at least one of the time-divided signal or signals from the light-emitting element **(col2 ln64-67 to col3**

ln1 in which optical gating (e.g part of demultiplexer-13)(light-receiving element) is used to received and decode the optical TDM signal); and

one or more output signal separation means for decoding at least one of the time-divided signal or signals and for outputting same to at least one of the respective channel or channels **(col2 ln64-67 to col3 ln1 in which optical gates are used to decoded/separate the optical TDM signal; thereby, outputting the separated channels)**.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify AAPA and incorporate King's teachings of using a TDM scheme to allow one transmission channel to carry N tributary channels. The motivation being that this allows more channels to be transmitted simultaneously via one channel; thereby, increasing system efficiency and data throughput.

Regarding claim 7, AAPA discloses a multichannel photocoupler comprising:

at one or more input sides: a light-emitting element transferring one or more signals to at least one of the output side or sides **(FIG. 11 (LEDs-1a-d) in which the LEDs (light emitting elements) transfer signals to the output side)**; and

one or more level coupling means for carrying out level coupling with respect to one or more input signals at least one of the respective channel or channels so as to impart one or more changes in one or more optical intensities at the light-emitting element **(FIG. 11 (LED-1a) in which the LED is inherently intensity modulated in order to transmit channel data to the output as is the basic function of an optical communication system)** and for causing same to be transferred to at least one of the

output side or sides **(FIG. 11 (LED-1A) in which the data from input channel 1 is transferred to the output side (e.g. to output channel 1))**;

at one or more output sides: a light-receiving element receiving one or more signals imparted with one or more changes in one or more optical intensities produced by the light-emitting element **(FIG. 11 (2a-photodiode) in which the photodiode receives the signal produced by the light-emitting element (e.g. signal produced by LED-1a))**.

AAPA does not expressly disclose one or more output signal separation means for decoding at least one of the signal or signals and for outputting same to at least one of the respective channel or channels. However, it is well known in the art to decode/demodulate a signal that has been modulated with information. Therefore, allowing data to be extracted from the received signal. As evidence of this well known concept, prior art reference King is provided. King discloses one or more output signal separation means for decoding at least one of the signal or signals and for outputting same to at least one of the respective channel or channels (col2 ln52-67 to col3 ln1 in which the received signal is decoded in order to extract the tributary channels). Thereby, allowing for modulated/encoded data to be decoded/demodulated at the receiver side of an optical transmission system.

Regarding claim 18, rejected as stated in claim 7 rejection.

Allowable Subject Matter

Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis F. Garcia whose telephone number is (571)272-7975. The examiner can normally be reached on 8-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken N. Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LG

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER